

Appendix 2

Estimation of possibilities of small sizes crushed limestone of Lavsk quarry as a coarse aggregate of normal concrete on the Moscow plant of precast concrete No. 10

Results of sieve analysis of sample of fraction 3-10 mm are presented in the Table 1.

Table 1

	Dimensions of Square Openings (mm)							
	10.0	5.0	2.5	1.25	0.63	0.315	0.16	Under 0.16
Sieve residue (%)	2.4	30.6	58.7	3.0	0.9	1.66	2.2	0.54
Total remains (%)	2.4	33.0	91.7	94.7	95.6	97.26	99.46	100

This crushed limestone was tested as a coarse aggregate for concrete for prestressed piles, which are the main and the most important product of this plant. Piles are manufactured only with the granite crushed stone as a coarse aggregate with the consumption of 460 kg of portland cement Brand 500-DO-N of Volsk cement plant per cubic meter of concrete. The peculiarity of concrete for prestressed piles is the requirement for one-day cubic compressive strength; it should be no less than 300 kgf/cm². Standard cubes 10x10x10 cm were made with the consumption of cement in the range 500 to 400 kg per cubic meter. According to Russian building practice of production of precast concrete, cubes were subjected by the standard steam-curing according to next pattern; 3+3+6+4, i.e. 3 hr conditioning, 3 hr of the temperature rise to 80°C, 6 hr isothermal warming, and 4 hr cooling. Results of test are presented in the Table 2.

Table 2

Number	Composition of ready-mixed concrete (kg/m^3)					Slump (cm)	Cubic compressive strength MPa			
	Cement	Sand	Coarse aggregate	Water/ cement ratio	Admixture		1 day		28 days	
							f cu	f _{cu} avg	f _{cu}	f _{cu} avg
1	500	483	1060	0.324	-	6	20.9	22.60	29.9	30.60
							24.3		33.3	
2	500	483	1060	0.308	0.5	7	21.8	21.10	30.4	29.45
							20.5		28.5	
3	500	483	1060	0.420	-	8	20.9	20.65	39.9	39.45
							20.4		39.4	
4	500	512	1110	0.370	-	6	23.8	24.50	46.5	46.05
							25.2		45.6	
5	500	512	1110	0.280	0.3	6	41.8	42.00	46.1	47.75
							42.2		49.4	
6	450	560	1110	0.280	0.3	6	35.6	34.80	40.9	40.40
							33.7		39.9	
7	400	610	1110	0.280	0.3	4	32.3	34.20	43.2	43.45
							36.1		43.7	